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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 09/998,446 | 11/30/2001 | Jorg-Thomas Zettler | 101215-75 | 6307 |
| 27387 | 7590 | 01/22/2004 | EXAMINER | |
| BRUCE LONDA NORRIS, MCLAUGHLIN & MARCUS, P.A. 220 EAST 42ND STREET, 30TH FLOOR NEW YORK, NY 10017 | | | LYONS, MICHAEL A | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2877 | |

DATE MAILED: 01/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/998,446 | ZETTLER ET AL. | |
| | Examiner | Art Unit | |
| | Michael A. Lyons | 2877 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-12 and 14-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-12 and 14-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10-12 and 14-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugawara et al (4,203,799) in view of Case et al (4,555,767).

Regarding claim 10, Sugawara discloses a method where, as epitaxial layers are grown on a substrate under constant processing conditions (such as implantation energy in claim 7 and temperature in claim 8), the thickness of the epitaxial layers is monitored "by the use of light received from the surface of said thin surface layer and from the surface of said insulating material region in the form of an interference waveform and controlling the reaction of epitaxial growth based on the obtained thickness information". Sugawara, however, fails to disclose the explicit use of Fabry-Perot oscillations and the comparison of the measured interference waveform with a standard.

With regards to the use of Fabry-Perot oscillations, it is the position of the examiner that Fabry-Perot oscillations are created by interference by light reflecting off varying surfaces of the epitaxial growth layers, such as in Figure 1 of Sugawara. This interference can generate an interference waveform such as in Figure 3 of Sugawara, making the Fabry-Perot oscillations a functional equivalent to a normal interference waveform. Additionally, Case (abstract) states, in the process of measuring the thickness of an epitaxial layer, "the measured values of spectral

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reflectance are correlated with a series of theoretical reflectance values determined for different thicknesses of an epi layer in a range including the nominal thickness. The measured or actual epi thickness is determined from the correlation values.” The measured values of the spectral reflectance will also generate an interference waveform (see Figure 3), with the correlation of the measured values with the standard values providing more accurate measurements of the growth layer.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the more refined measuring and calculation method of Case with the overall method of Sugawara in order to facilitate a more accurate measurement of the thickness of the epitaxial growth layers being built up using the method of Sugawara.

As for claim 11, the multi-layer material of Sugawara is a semiconductor (Col. 1, lines 18-25).

As for claim 12, the interference waveform is sinusoidal in Sugawara, thus generating an oscillation minimum to be utilized.

As for claim 14, Case discloses the use of reference values.

As for claim 15, normalizing a value is standard experimental practice.

As for claim 16, the step of stopping growth during a process to check the progress and accuracy of the material being built is standard experimental practice.

As for claim 17, Case measures values of spectral reflectance in order to make various measurements of the epitaxial layer.

As for claims 18-21, Sugawara discloses a process temperature, time, composition, thickness, etc. in column 2, lines 33-56.

Response to Arguments

Applicant's arguments filed November 17, 2003 have been fully considered but they are not persuasive. From the examiner's previous Office Action, it was stated that in particular, it is in the opinion of the examiner that the use of the term "Fabry-Perot oscillations" is functionally identical to the use of a standard interference waveform generated by light waves reflecting off of various surfaces of a multi-element material, with the interference being generated by the delay in the light traveling through different layers, each layer having a different refractive index, in the material. The different refractive indices slow down the light, generating the interference with the light reflecting only off of the surface of the material and remaining strictly in air, for example, when each light beam is detected.

Furthermore, the applicants' arguments in response to that previous Office Action center around the fact that the combination of the Sugawara reference and the Case reference "only refer to measuring of the thickness of a layer or measuring of the growth rate", while "the present invention relates to the determine of the absolute wafer process temperature and composition of the layers". However, the applicants' arguments point towards a statement located in the preamble of the independent claim. While the preamble of the claim does direct the claim towards a particular function, the language holds no patentable distinction. As such, because the combination of Sugawara and Case disclose the patentably distinct method steps as stated above with regards to claim 10 and the dependent claims, the rejection stands.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael A. Lyons whose telephone number is 571-272-2420. The examiner can normally be reached on Monday thru Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0935.

MAL
January 12, 2004



Samuel A. Turner
Primary Examiner